Chapter 13: Energy Systems

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Earthquake Restoration Times- Northridge and 7.8 Worse Case Quake

Northridge Earthquake Comparison

LA Power System	Northridge	Shakeout
Number of Lines Damaged	26 (25% of System)	~13 (13% of System)
Restore Power to Normal	14 days	~28+ days

93% of Customers were Restored in 24 Hrs

- Northridge was a 6.7 magnitude earthquake ($20B in losses)
- Shakeout is an estimate for a Los Angeles area 7.8 quake

Source: Potential Impacts to Water and Electric Services from a M7.8 Southern San Andreas Earthquake. H. David Nahai, CEO and GM, LADWP

Key Lesson Learned

Longest electric outages to date have been 4 weeks

Preparation Prioritization Issues

- ***Electric Energy***
  - ***Clustered, below grade transformers***
  - ***Single pole substation high and low voltage feeds***
  - ***Fuses, not breakers in many locations***
  - ***Underground ducts run close together and crossing in many shallow manholes***
  - ***Lack of automation***
- ***Non-electric Energy***
  - ***Liquid and gaseous fuels infrastructure***
- ***Communications – identify dependencies***

Key Recovery Issues

- Generation
  - Bulk – may not be highest priority
  - Distributed - activate
- Transmission – assess work-arounds (sub-trans)
- Distribution
  - Make it safe
  - Make it accessible
  - Identify essential services and prioritize restoration
  - Activate mutual aid as/if required
- Determine if temporary services required
  - Traffic light power, gas stations, grocery

Recovery Levels

- ***Emergency Facilities and Services Restoration***
- ***Critical Rights of Way and Infrastructure Restoration***
- ***Socio-Economic Continuity Restoration***

Community Energy Assurance Planning